CINT User Program Update

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5th CINT User Workshop
January 17, 2007

"One scientific community focused on nanoscience integration"

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CINT is a DOE/BES National User Facility

- Open, no cost access to facilities based on scientific quality and relevance to CINT science
- Spectrum of user modes
  - Access to equipment
  - Collaborative research
  - Short & long term projects (1 year max duration)
- External Proposal Review Panels (new)
- Mechanisms for proprietary work (begin in 2007)
- Renewal Proposals (new)
- Rapid Access Proposals (new)
- Next Call for User Proposals: February 2007

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General User Access Modes

- Users who request access to capabilities that are in the CINT user program. (Independent)

- Users who would like to access technical expertise and capabilities that are part of CINT's scientific thrusts. (Collaborative)

CINT Capabilities

- **Synthesis**
- **Characterization**
- **Theory & Simulation**
- **Discovery Platforms™**

Download the complete CINT capability list from…

http://CINT.sandia.gov **http://CINT.lanl.gov**

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Each capability has a brief description and associated scientists

Bio-inspired and bio-compatible materials

The biomaterials synthesis capabilities will enable researchers to isolate, engineer, and integrate biological molecules with nanoscale synthetic materials and systems. Because native biological molecules are, in general, poorly suited for integration with synthetic systems, we focus upon engineering biomaterials specifically designed to function in synthetic nanosystems. Additionally, functionalization of biological molecules will be studied with respect to developing strategies for integrating living and non-living components that have a common interface. The capabilities that are available to CINT Users include:

- Isolation of genomic DNA, RNA, and plasmids from a variety of sources such as bacteria, viruses, and eukaryotic cells
- Growth and maintenance of a range of organisms (e.g., thermophiles, halophiles, etc.)
- Recombinant DNA cloning and expression in prokaryotic and eukaryotic systems
- Genetic engineering using reverse transcription, the polymerase chain reaction (PCR) and site-directed mutagenesis (SDM)
- Expression, purification, characterization, and functionalization of native and recombinant proteins
- Synthesis and functionalization of bio-compatible nanocrystal optical and magnetic tags (semiconductor and metal nanocrystals)
- Design of heterfunctional biomolecules for materials assembly
- Mammalian cell culture (nanoparticle interactions, cell/sub-cellular targeting of nanoparticles, etc.)

Associated CINT Scientists:

Dr. George Bachand, gdbacha@sandia.gov, (505) 844-516
Dr. Jennifer Hollingsworth, jenn@lanl.gov, (505) 665-1246
Dr. Gabriel Montaño, gbmon@lanl.gov, (505) 667-6776
Dr. Jennifer S. Martinez, jenm@lanl.gov, (505) 665-0045

CINT Thrust Leaders & Scientists

Jennifer S. Martinez, CINT, LANL

Primary research interests are in biomaterials synthesis and biosensors, with emphasis on producing and utilizing molecular recognition molecules for the hierarchical assembly of materials. Current research activities are focused on producing nano- and macro-scale biosensors that are reagent free and field deployable; the use of combinatorial libraries to synthesize small monodisperse gold and silver nanoclusters; and the study and predictive control of nanoparticle interactions with mammalian cells. Additional research interests include the production of unique phage display libraries for biocompatible materials generation; the study of colligative properties of lipid assemblies produced by molecular recognition; and the production of heterobifunctional ligands for materials assembly. Research skills include characterization of ligand organized lipid assemblies by light scattering, microscopy, and langmuir-blodgett films; natural product structure determination (NMR, MS-MS); chemical conjugation methods; biosensor development; biosynthesis of nanomaterials; and recombinant biology and biochemistry (cloning and protein chemistry). Primary CINT capabilities utilized include large standard molecular biology and biochemistry laboratories for recombinant protein generation; phage display of custom peptide and scFv libraries; peptide-synthesis and characterization; mammalian cell culture and interaction of such with nanoparticles.

Contact: jenm@lanl.gov, (505) 665-0045
Thrusts: Nano-bio-Micro Interfaces and Nanophotonics and Nanoelectronics

Download the complete CINT Scientist list from…

http://CINT.sandia.gov http://CINT.lanl.gov

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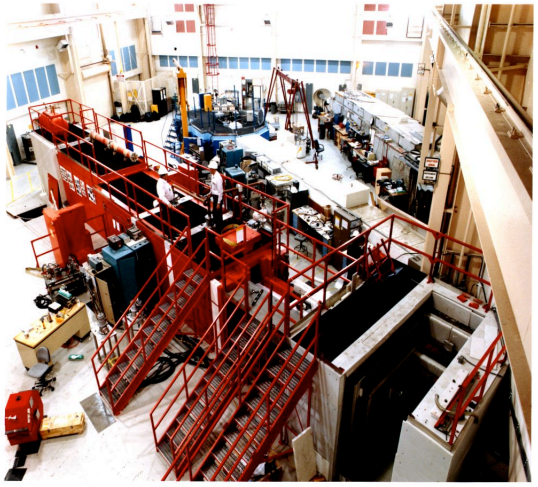
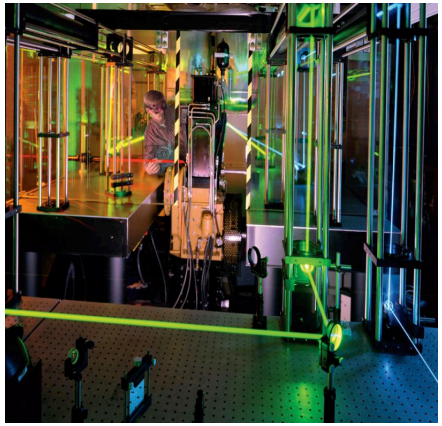
CINT User proposals can involve these National User Facilities

Los Alamos Neutron Science Center



Combustion Research Facility



National High Magnetic Field Lab

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Step-by-Step User Proposal Submission

CINT issues a Call for User Proposals…

1. Identify appropriate CINT scientist(s) & capabilities
2. Discuss idea with CINT scientists (optional)
3. Write 2-page User proposal
4. Choose open access or proprietary
   (a) NSRC Pre-competitive User Agreement, or
   (b) CRADA (full cost recovery)
5. Submit via CINT web site before deadline!

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CINT Proposal Evaluation Process

1. CINT conducts an internal feasibility screening (pass, fix, or fail)
2. Feasible proposals are assigned to one of six Proposal Review Panels for external peer review.
3. Panel returns a priority score (High, Medium, Low) with feedback comments.
4. CINT approves proposals based upon priority score, comments, and capability availability.
5. User notified; brief feedback provided

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CINT User Proposal Review Panels

Chemical Synthesis & Properties

Includes wet synthesis, surface/interface chemistry, surface functionalization, IFM, colloidal science, polymer science, fluidics, fluidic synthesis Discovery Platform

Chair - Devens Gust, Arizona State U

Electronics/Magnetics Synthesis & Properties

Includes physical synthesis (MBE, CVD, thin film deposition, PLD), transport, STM, TEM, SEM, transport Discovery Platform

Chair - Sanjay Krishna, UNM

Mechanics, Fabrication/Integration & Assembly

Includes NEMS/MEMS, mechanical response, nanoindentation, fabrication-focused processes, self-assembly, cantilever Discovery Platform

Chair - Ian Robertson, U Illinois- Urbana Champaign

Each panel consists of 5-6 reviewers in that focused technical area.

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CINT User Proposal Review Panels (con't.)

Bio-Nano Materials

Includes bio-inspired materials, bio-hybrid materials, biomolecular recognition, lipid membranes, bio-fluidic Discovery Platforms

Chair – Angel Garcia, RPI

Photonics, Spectroscopy & Microscopy

Includes photonic lattices, ultrafast spectroscopy, terahertz spectroscopy, near-field microscopy, optical based Discovery Platforms

Chair - Richard Haglund, Vanderbilt University

Theory & Simulation Virtual Panel

Members all sit on above experimental panels — convene if special theory & simulation issues.

Each panel consists of 5-6 reviewers in that focused technical area.

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When your User Proposal is accepted…

1. Execute User Agreement or negotiate CRADA
2. Research scheduled
   (CINT Scientists & User Administrators)
3. User conducts research at CINT
   (1 year maximum duration)
4. Report publications & presentations to CINT
5. Approved proposals are eligible to continue upon submission of annual Renewal Proposals.

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Rapid Access *User Proposals*

- Access to CINT between regular proposal submission cycles for time-critical, focused, high-impact research.
- User submits two-page proposal via CINT web-site.
- Expedited feasibility screening & proposal review.
- Approval by CINT Director / Associate Director.
- Rapid-Access user projects expire at next available regular proposal submission cycle.
- All regular reporting requirements apply.

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Working at CINT

Travel:	**Not paid by CINT; some support possible via other Lab programs**
Funding:	**CINT cannot fund Users**
Housing:	**Local options on web site**
Training:	**As required by LANL & SNL**
Badges:	**Initiated when proposal is accepted. Additional lead time required for Foreign Nationals**

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2007 Spring Call for User Proposals

Announced: *February 2007*

Focus:

- *R*esearch related to CINT Science Thrusts and/or CINT Nanoscience Integration Challenges
- Proposals that make use of CINT Discovery Platforms™

Submission Deadline: **March 15, 2007**

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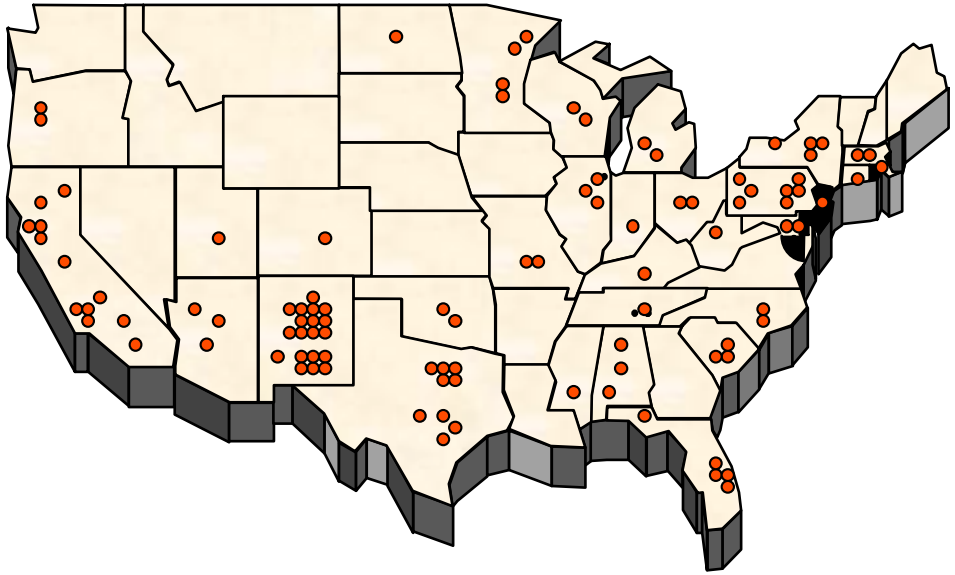
CINT User Executive Committee (UEC)

Mission: The UEC is an elected body of representatives that provides input from the User community to the CINT management team regarding facilities, operations, and science.



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The initial UEC membership

Prof. Sankar Das Sarma, Chair
University of Maryland

Prof. Robert Haddon
University of California, Riverside

Prof. Julia Weertman
Northwestern University

Prof. Atul Parikh
University of California, Davis

Prof. Sanjay Krishna
University of New Mexico

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UEC Roles & Responsibilities will be defined in the Charter and By-Laws

- **Provide feedback and advice on User Program to CINT management & BES**
- **Provide input to help shape CINT science**
- **Co-organize CINT User Meetings and workshops**
- **Other?**

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